DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99
Revised 9/20/02

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **Hawkeye Castings**
Facility Address: **1077 South 3rd Street, Manchester, Iowa**
Facility EPA ID #: **IAD984599589**

DETERMINATION RESULT: YES

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   __X_ If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available, skip to #8 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

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Relationship of EI to Final Remedies
While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations
EI Determinations status codes should remain in RCRA Info national database ONLY as long as they remain true (i.e., RCRA Info status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act]) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

_____ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

__X__ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):
Hawkeye Castings, Inc. (Hawkeye) is located in the Manchester Industrial Park at 1077 South 3rd Street in Manchester, Iowa. The location can further be described as lying in the southwest ¼ of Section 32, Township 89 North, Range 5 west of the Fifth Principal Meridian. The location is shown on Figures 1a and 1b. The business began operating at the noted location in 1961 where they produced aluminum, brass, and bronze castings from sand molds. The site consists of approximately six acres, with a single building housing both the foundry and office/administrative functions. The Environmental Protection Agency (EPA) established that some portion of the foundry sand generated at the site exceeded the maximum concentration for lead when tested using the toxicity characteristic leaching procedure (TCLP), D008.

An area approximately 500 feet by 200 feet west of the plant received waste foundry sand over a period of 30 years, see Figure 2. The sand was generally mixed with site soil and fill to about one foot depth above the original grade. The waste area is thicker closer to the building and thins to undetected 500 feet west of the building. A layer of silt clay was placed over the fill area and overlain with topsoil.

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[1]"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

As part of closure activities conducted under a 3008(h) Consent Order, four temporary monitoring wells were installed in September 1999, in the area of foundry sand deposition. The depth to groundwater during sample collection activities in 2000, 2001, and 2002 ranged from 3.35 feet to 6.10 feet below ground surface. The well locations, TMW-1, TMW-2, TMW-3, and TMW-4 are shown on Figure 3. The well screens extended 5 feet below and two feet above the static water level encountered during borehole advancement. Groundwater flow direction was determined to be to the southeast.

Groundwater samples were analyzed for the 8 RCRA metals, including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The closure performance standards for groundwater are those listed in Table 1 of Title 40 of the Code of Federal Regulations Part 264 Section 94 (40 CFR 264.94). The values in Table 1 of 40 CFR 264.94 are the maximum contaminant levels (MCLs) under the Safe Drinking Water Act that were in place at the time the table was promulgated. Because the MCLs have changed for most of the metals since the values in Table 1 of 40 CFR 264.94 were promulgated, this document also compares analytical results to current MCLs.

The first and second round of groundwater samples were collected on May 3, 2000, and February 21, 2001, using bailers without filtering. The results of both sample events showed metals (arsenic, cadmium, chromium, lead, and selenium) concentrations that exceeded the performance standards and MCLs. See Table 1 below for bailer method results. Because the turbidity of the bailer method samples was high (ranging from 341 to 2052 nephelometric turbidity units (NTUs)), it is anticipated to be the cause of the performance standard exceedences. A large amount of soil in a water sample (i.e., high turbidity reading) can cause a metal concentration to be significantly higher than a low turbidity sample due to metals adsorbed to the soil particles. The EPA generally prefers that the turbidity for a water sample be below 50 NTUs. Because groundwater sampling with bailers can sometimes create turbid samples or samples with a significant amount of suspended solids such as soil, the turbidity of samples was measured during the sample collection process to evaluate the amount of suspended solids. For some metals, naturally occurring background concentrations can cause an elevated measurement of concentration, especially with suspended soil in the sample, i.e., high turbidity.

Table 1
Groundwater Concentrations Compared to Performance Standards
And Maximum Contaminant Levels

	Performance Standard, mg/L	Maximum Contaminant Level, mg/L	Maximum GW Concentration, mg/L Bailer method May 2000/February 2001 Turbidity 341 to 2052 NTUs	Maximum GW concentration, mg/L Low flow method April 2001 November 2001 April 2002 September 2002
Arsenic	0.05	0.01	0.101 **	0.0045
Barium	1.0	2.0	0.584	0.0919
Cadmium	0.01	0.005	0.032 **	**0.00731 ***
Chromium	0.05	0.1	0.243 **	ND (DL 0.015 to 0.020)
Lead	0.05	0.015 Action level	0.594 **	0.0088
Mercury	0.002	0.002	0.00037	ND (DL 0.0002)
Selenium	0.01	0.05	ND (DL 0.002 to 0.15**)	ND (DL 0.002 to 0.005)
Silver	0.05	0.1 SMCL	0.030	ND (DL 0.020 to 0.025)

Milligrams per liter = mg/L
GW = groundwater
SMCL = secondary maximum contaminant level
Bailer method turbidity ranged from 341 to 2052 NTUs.
Low flow method turbidity ranged from 0 to 70 NTUs.
ND = not detected
DL = Detection limits range
NTU = Nephelometric Turbidity Unit
*= exceeded MCL/action level, but not performance standard
**= exceeded MCL/action level and performance standard
Analyte list was reduced to arsenic, cadmium, chromium, and lead after the April 2001 sampling event showed non detect values for mercury, silver, and selenium; and barium ranging from 0.032 to 0.0919 mg/L, with a performance standard of 1.0 mg/L.

To reduce turbidity generated by manual bailing, four additional sampling rounds were conducted using low-flow peristaltic pumps in April 2001, November 2001, April 2002, and September 2002. The turbidity in the low-flow method samples ranged from 0 to 70 NTUs. The maximum concentrations detected during groundwater sampling using low-flow sampling techniques are presented in Table 1 above in the low flow method column. All of the metals concentrations measured during the four rounds of sampling using low-flow sampling procedures were below closure performance standards and the MCL with the exception of one detection of cadmium.

Cadmium results and turbidity measurements for all sample events using the low flow sampling method are shown in Table 2. Cadmium was not detected in any of the samples collected in Wells TMW-1, TMW-2, and TMW-3, i.e., non-detect in 17 samples. Cadmium was not detected in Well TMW-4 during three of the four rounds of sampling. During the November 2001 sampling event, three samples were collected from this well; one by the facility, and two (an original and split sample) by EPA. The facility sample result was 0.0005 mg/L, below the MCL and performance standard. The EPA original sample was 0.00731 mg/L, below the performance standard, but above the MCL. The EPA split sample was non detect with a detection limit of 0.003 mg/L. A separate turbidity measurement was not collected for these two EPA split samples. Cadmium has not been identified as a site-related chemical. The sole detection above the current MCL is considered an anomaly and not representative of cadmium concentrations in this well.

Table 2
Cadmium Results in Groundwater

	TMW-1		TMW-2		TMW-3			TMW-4	
Date	Cadmium mg/L	Turbidity NTUs	Cadmium mg/L	Turbidity NTUs	Cadmium mg/L	Cadmium mg/L Facility split	Turbidity NTUs	Cadmium mg/L	Turbidity NTUs
4/26/01	ND (0.005)	16.8	ND (0.005)	61.2	ND (0.005)	ND (0.005)	1.5	ND (0.005)	68.1
11/29/01	ND (0.005)	60	ND (0.005)	70	ND (0.005)	ND (0.005)	1.3/0	0.0005	60
11/29/01 EPA split					ND (0.003)		Not measured	**0.00731 *** ND (0.003)	Not measured
4/30/02	ND (0.005)	7.9	ND (0.005)	5.5	ND (0.005)	ND (0.005)	1.6/1.0	ND (0.005)	15
9/12/02	ND (0.005)	35.5	ND (0.005)	1.5	ND (0.005)	ND (0.005)	3.3/3.1	ND (0.005)	15.4

mg/L= milligrams per liter
*=exceeded MCL, but not performance standard

In summary, the results of groundwater sampling do not indicate site-related impact of metals in groundwater.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

_____ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

A surface water sample was collected for analysis from an unnamed creek along the south border of the site. The only metals detected in the surface water sample were copper 20 ug/L and barium at 76 ug/L. Copper does not have a maximum contaminant level, but has an action level of 1,300 ug/L. The MCL for barium is 2,000 ug/L. The detected concentrations of these metals were below the MCL, and as such, site related contamination was not detected in surface water.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

   _____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

   _____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

   _____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5]The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

8. Check the appropriate RCRA Info status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Hawkeye Castings facility, EPA ID # IAD984599589, located at 1077 South 3rd Street, Manchester, Iowa. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN - More information is needed to make a determination.

Completed by _____ Date 8/24/2012
(signature)
Mary Grisolano
Project Manager, Missouri Iowa Remediation and Permitting Section
Waste Remediation and Permits Branch

EPA Region 7

Supervisor _____ Date 8/24/2012
(signature)
Jeremy Johnson
Section Chief, Missouri Iowa Remediation and Permitting Section
Waste Remediation and Permitting Branch
EPA Region 7

Locations where References may be found:

EPA Region 7 Headquarters
RCRA Files
901 North 5th Street
Kansas City, Kansas 66101

Contact telephone and e-mail numbers

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Google

Address **Manchester, IA 52057**

Get Google Maps on your phone
Text the word "GMAPS" to 466453

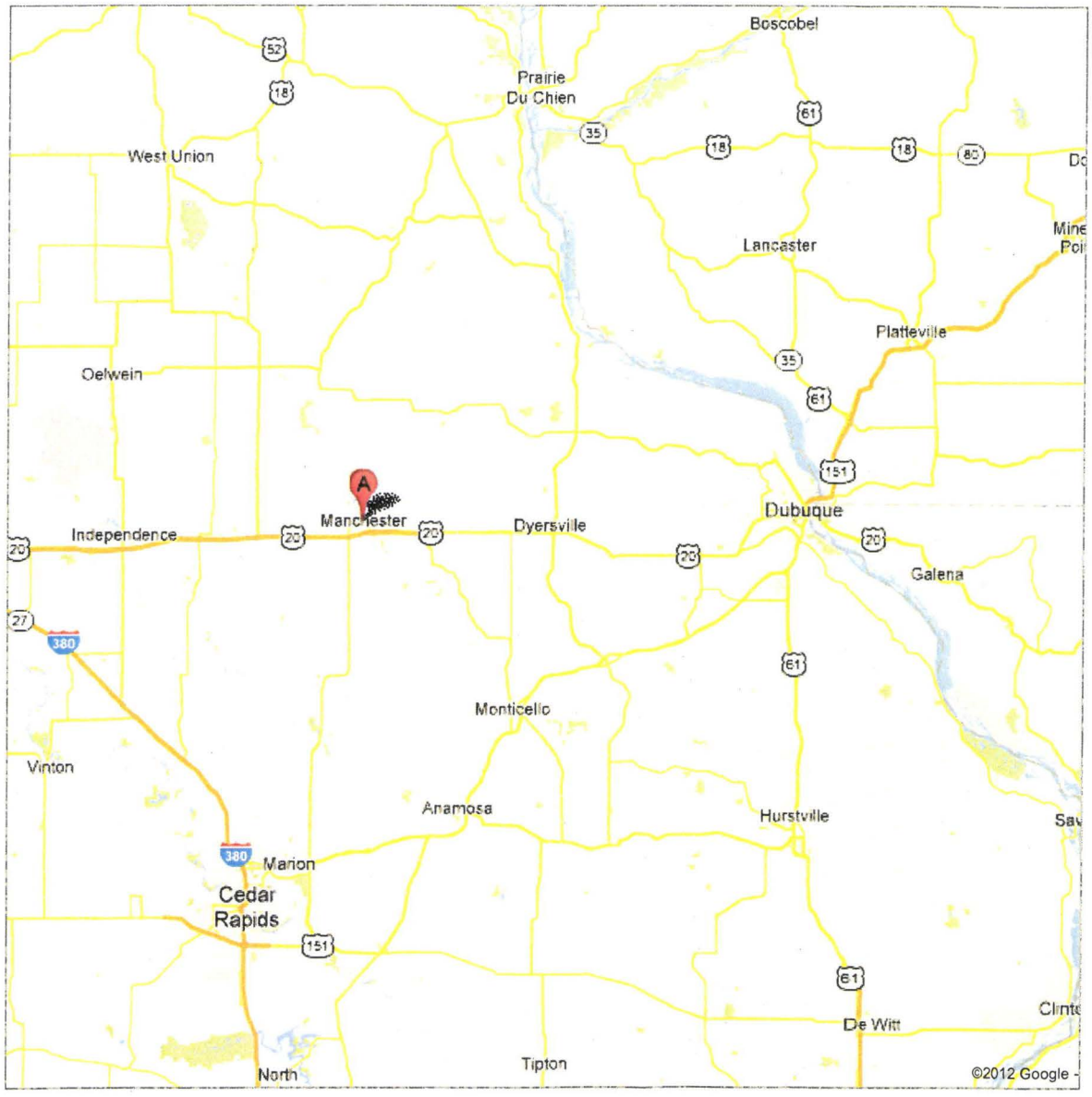

Figure 1a
Hawkeye Castings, Inc. Site Location Map

Google

Address **1077 S 3rd St**
Manchester, IA 52057

Get Google Maps on your phone
Text the word "GMAPS" to 466453

Figure 1b
Hawkeye Castings, Inc. Site Location Map

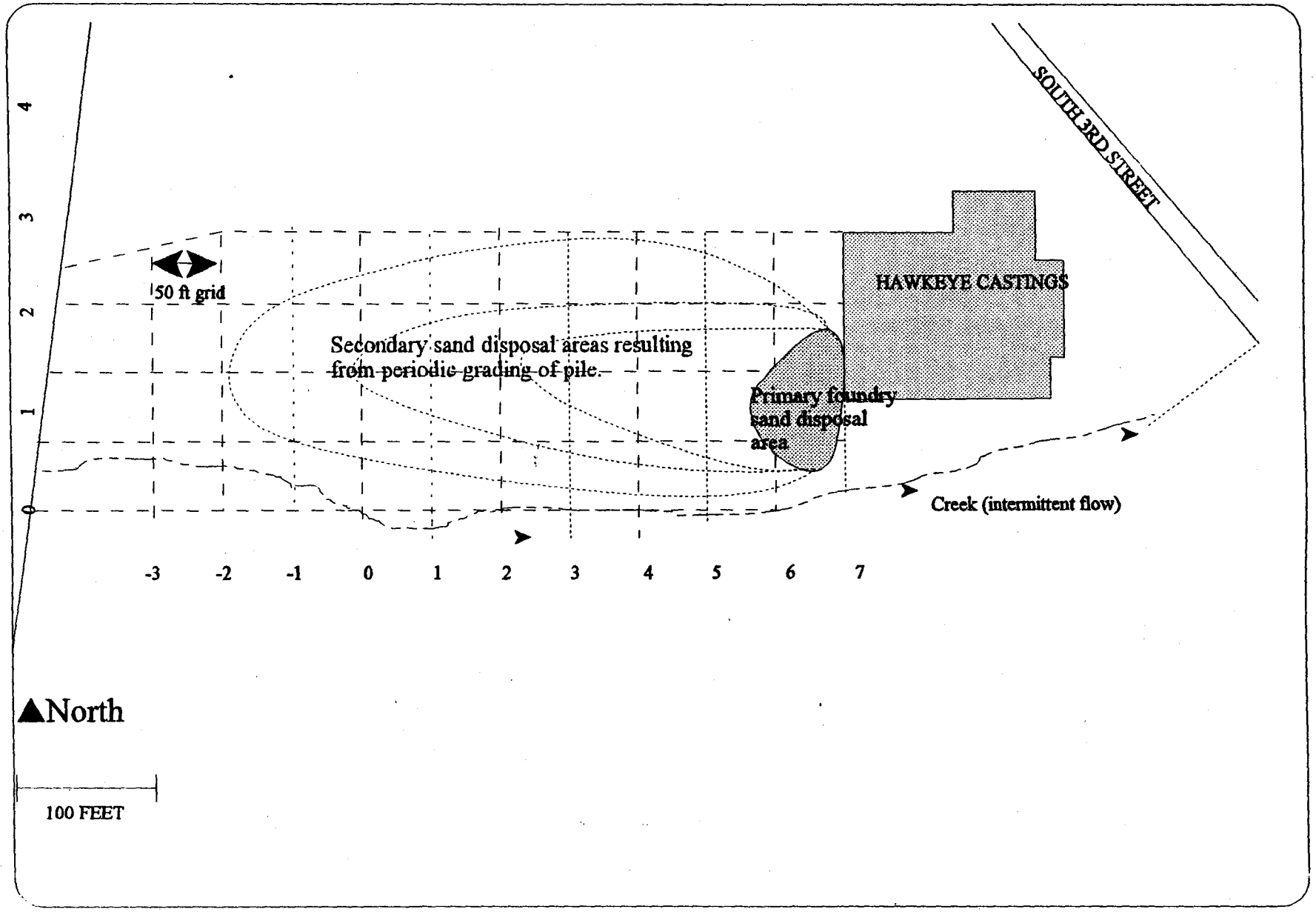

Figure 2
Approximate Area of Foundry Sand Placement
Hawkeye Castings, Inc

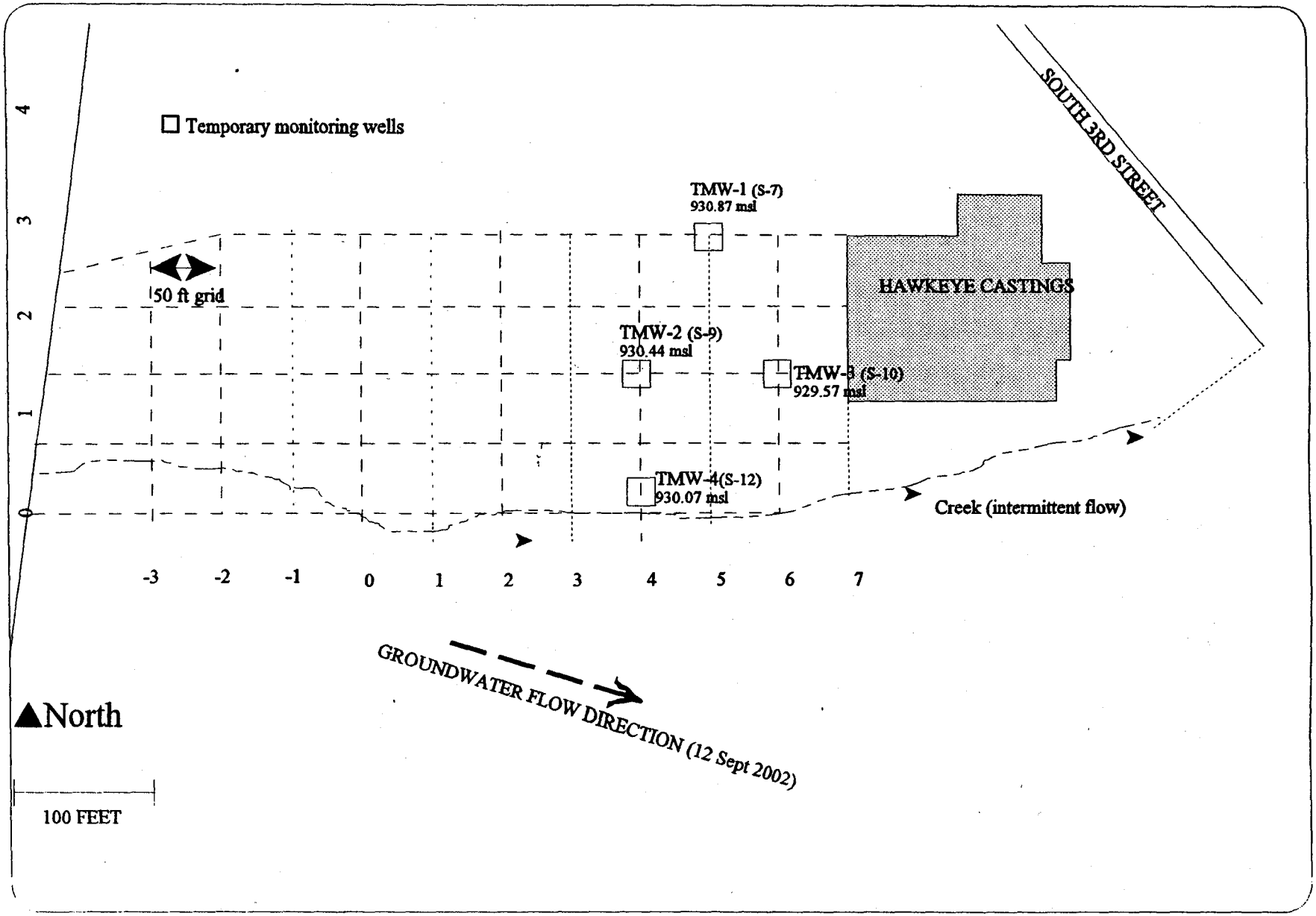

Figure 3
Well Location Map
Hawkeye Castings, Inc